Solenoid operated spool valve

**Flange construction**
- 4/2-way impulse execution, detented
- 4/3-way with spring centred mid position
- 4/2-way with spring reset
- $Q_{\text{max}} = 80 \text{l/min}$
- $p_{\text{max}} = 350 \text{ bar}$

**APPLICATION**
Spool valves are mainly used for controlling direction of movement and stopping of hydraulic cylinders and motors. Switching performance and leakage of the valves must be taken into account when designing the system. Solenoid spool valves are suitable for machine tools and handling systems of any kind.

**DESCRIPTION**
Direct operated solenoid spool valve with 4 connections in 5 chamber design. Spool detented or with spring reset. With the solenoids deenergised, the spool is held in the center position by the spring (4/3), or switched back to the offset position (4/2). With the impulse spool (4/2), the spool is held in the switching position by the detent. Precise spool fit, low leakage, long service life time. Spool made from hardened steel, valve body from high quality hydraulic cast steel. Wide range of standard and special voltages.
## GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Designation</th>
<th>4/2-, 4/3-spool valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Direct operated</td>
</tr>
<tr>
<td>Nominal size</td>
<td>NG6 according to ISO 4401-03</td>
</tr>
<tr>
<td>Actuation</td>
<td>Switching solenoid</td>
</tr>
</tbody>
</table>
| Ambient temperature | -25...+70 °C                           
|                   | if > +50 °C, then no undervoltage is admissible           |
| Weight            | 1.53 kg (1 solenoid Economy)                             
|                   | 2.07 kg (2 solenoids Economy)                            |
| MTTFd             | 150 years                                                 |

## INSTALLATION NOTES

<table>
<thead>
<tr>
<th>Mounting type</th>
<th>Flange mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4 fixing holes for socket head screws M5 x 50</td>
</tr>
<tr>
<td>Mounting position</td>
<td>Any, preferably horizontal</td>
</tr>
</tbody>
</table>
| Tightening torque  | Fixing screws M₅ = 5.2 Nm (screw quality 8.8, zinc coated)  
|                   | M₅ = 5 Nm knurled nut                                   |

**Note!** The length of the fixing screw depends on the base material of the connection element.

## ACCESSORIES

- Mating connector grey (A) Article no. 219.2001
- Mating connector black (B) Article no. 219.2002
- Mounting screws Data sheet 1.0-60
- Threaded subplates Data sheet 2.9-30
- Multi-station subplates Data sheet 2.9-60
- Horizontal mounting blocks Data sheet 2.9-100
- Technical explanations Data sheet 1.0-100
- Filtration Data sheet 1.0-50
- Relative duty factor Data sheet 1.1-430

## ACTUATION

- Actuation: Switching solenoid, wet pin push type, pressure tight
- Execution: W.E45 / 23 x 50 (Data sheet 1.1-182)
- M.S45 / 23 x 50 (Data sheet 1.1-181)
- Connection: Connector socket EN 175301 – 803
  - Connector socket AMP Junior-Timer
  - Connector Deutsch DT04 – 2P
ELECTRICAL SPECIFICATIONS

Protection class
Connection execution D: IP65
Connection execution J: IP66
Connection execution G: IP67 and IP69K

Relative duty factor
100 % DF

Switching frequency
15'000 / h

Service life time
10^7 (number of switching cycles, theoretically)

Voltage tolerance
± 10 % with regard to nominal voltage

Standard nominal voltage
12 VDC, 24VDC, 115 VAC, 230 VAC
AC = 50 to 60 Hz, rectifier integrated in the connector socket

Note! Other electrical specifications see data sheet 1.1-182 (slip-on coil W) and 1.1-181 (slip-on coil M)

HYDRAULIC SPECIFICATIONS

Working pressure
p_{max} = 350 bar

Tank pressure
p_{max} = 200 bar

Maximum volume flow
Q_{max} = 80 l/min, see characteristics

Leakage oil
See characteristics

Fluid
Mineral oil, other fluid on request

Viscosity range
12 mm^2/s…320 mm^2/s

Temperature range
-25…+70 °C (NBR)

Contamination efficiency
Class 20 / 18 / 14

Filtration
Required filtration grade B 10…16 ≥ 75, see data sheet 1.0-50

PERFORMANCE SPECIFICATIONS

Oil viscosity \( u = 30 \) mm^2/s

p = f (Q)
Performance limits
Measured with nominal voltage -10 %

\[ p \text{ [bar]} \]

\[ Q \text{ [l/min]} \]

\[ p_{max} = 350 \text{ bar} \]

\[ Q_{max} = 80 \text{ l/min} \]

\[ \Delta p_{max} = 350 \text{ bar} \]

Volume flow direction

<table>
<thead>
<tr>
<th>Symbol</th>
<th>P - A</th>
<th>P - B</th>
<th>P - T</th>
<th>A - T</th>
<th>B - T</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB1 / AB2 / AB3</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>ADB / AD1 / DB2</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>BEA / BE1 / EA2</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>AFB / AF1 / FB2</td>
<td>4</td>
<td>4</td>
<td>-</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>AGB / AG1 / GB2</td>
<td>4</td>
<td>4</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

STANDARDS

Mounting interface
ISO 4401-03

Solenoids
DIN VDE 0580

Connection execution D
EN 175301 – 803

Protection class
EN 60 529

Contamination efficiency
ISO 4406

SEALING MATERIAL

NBR or FKM (Viton) as standard, choice in the type code
DIMENSIONS
4/3-way valve (spring centred)
4/2-way valve (impulse)

HYDRAULIC CONNECTION

MANUAL OVERRIDE

◆ Integrated (–) Actuation pin integrated in the armature tube.
  Actuation by pressing the pin
◆ Push-button (HF1) Integrated in the knurled nut. Actuation by pressing the push-button
◆ Spindle (HS1) Integrated in the knurled nut. Actuation by turning the spindle (continuously variable valve actuation)

Attention! The actuation of the manual override is possible up to a tank pressure of:
40 bar Integrated (–)
40 bar Push-button (HF1)
100 bar Spindle (HS1)

PARTS LIST

<table>
<thead>
<tr>
<th>Position</th>
<th>Article</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>206.1...</td>
<td>WE45 / 23 x 50</td>
</tr>
<tr>
<td></td>
<td>206.7...</td>
<td>MS45 / 23 x 50</td>
</tr>
<tr>
<td>50</td>
<td>160.2093</td>
<td>O-ring ID 9,25 x 1,78 (NBR)</td>
</tr>
<tr>
<td></td>
<td>160.6092</td>
<td>O-ring ID 9,25 x 1,78 (FKM)</td>
</tr>
<tr>
<td>60</td>
<td>160.2222</td>
<td>O-ring ID 22,22 x 2,62 (NBR)</td>
</tr>
<tr>
<td></td>
<td>160.6222</td>
<td>O-ring ID 22,22 x 2,62 (FKM)</td>
</tr>
<tr>
<td>70</td>
<td>154.2701</td>
<td>Knurled nut M23 x 1,5 x 19,7</td>
</tr>
<tr>
<td>80</td>
<td>253.7004</td>
<td>Push-button</td>
</tr>
<tr>
<td>90</td>
<td>253.7002</td>
<td>Spindle</td>
</tr>
</tbody>
</table>

SURFACE TREATMENT

Standard:
- The valve body is painted with a two component paint
- The armature tube, the slip-on coil and the plug screw are zinc-nickel coated

Optionally (K8):
- All external parts are zinc-nickel coated
ISO 9227 (800 h) salt spray test

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